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**ACK2
OIL/GAS FIRED HOT WATER BOILERS**

ACK2-80 ACK2-3000

INSTALLATION, AND COMMISSIONING MANUAL

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1 INTRODUCTION

This manual comprises the information concerning the Installation, operation, use and maintenance of ACK2 hot water boilers. This manual alone is not sufficient for correct installation, operation and use, installers, services and user must obey the rules specified in current EN + local norms, EC directives and local codes. This manual gives supplementary information and precautions.

Keep this booklet near the appliance in a safe place in the boiler room for future reference.

Please read the manual very carefully in order to be able to operate your boiler safely and with high efficiency for a long period.

2 WARNINGS

- This boiler must be installed in accordance with the rules in force only in a well ventilated and frost free spaces.
- All installation, assembly and maintenance work must be carried out exclusively by fully trained, professionally qualified personnel and must conform with this manual and the local codes and requirements of the authority having jurisdiction, or in the absence of such requirements, apply to the EEC directives and European norms (EN).
- If the boiler is not used for the purposes other then specified in this booklet and incorrect installation, commissioning and use can cause a fire or explosion which may result property damage, personnel injury, or loss of life.
- Boiler is designed for hot water operation only (less then the boiling temperature) and the system pressure must be according to the limited operating pressure specified on the boiler name plate and in this booklet. Heat transfer medium is water.
- Boilers must be fired by gas or oil fuels specified in this manual and boiler plate.
- Boilers must be fired by a compatible burner certified to EN 676 (gas firing) or EN 267 (oil firing) to comply with the boiler efficiency requirement (92/42/EEC) directive and Appliances burning gaseous fuels (90/396/EEC) directive
- This is a B₂₃ appliance so the flue gases must be connected to an adequate draught chimney, without any flue gas leakage to the boiler room.
- It is essential that an appropriate pump is fitted in the circulation system which must be kept in automatic operation at all the times when the boiler in use.
- The filling and make up water must be according to the specifications given in this manual. Long term water treatment is essential to the economic operation and life of both new and refurbished heating systems.
- Never obstruct the ventilation openings to the boiler room for a safe and efficient operation. An adequate air supply for combustion and ventilation must be provided at all times.
- Boilers should be installed on a non-combustible, smooth and level foundation which is at least 150 mm high and according to these manual and local codes.

- Boilers must not be installed in areas where inflammable vapors and materials are likely to be present. To avoid damage to the boilers, contamination of the combustion air by high levels of dust or halogenated hydrocarbons (e.g. Solvents, spray can propellants, cleaning agents, adhesives, etc.) must be avoided. The humidity level must not be high in boiler rooms.
- The boiler room must not be used for other purposes and must not have an open connection to the other closed living areas. Connection door must be air tight, fire resistant and self closing.
- The oil or gas burners are equipped with an ignition device which automatically lights the pilot, and some more additional automated safety controls. Do not try to light the burner or operate the system manually. All the control devices must be functional and operating within the limits specified at all the time. If any of them is not functioning do not operate the system and call a qualified service.
- If the boiler is heated above 90 °C, do not supply cold water to the system for rapid cool down. It can cause an explosion. Wait the boiler cool down naturally up to 40 °C before adding make up water.
- Do not use this appliance if any part has been under water. Immediately call a qualified service to inspect.
- An emergency shut down switch must be placed in a proper place outside the boiler room. This switch must cut off the fuel line and must be identified by a name plate.
- In starting a new installation or if fuel lines have been disconnected after servicing, air must be purged from the fuel lines by a qualified person.
- In closed expansion systems with a membrane type expansion tank, tank gas pressure must be controlled regularly by a qualified service. If the pre-charge gas pressure is less than specified; then the system pressure will rise enormously and can cause an explosion.
- If the system is running with a fuel heavier than air and the boiler room is under ground level, then the firing system must have a flame control device and the possible leakage from fuel lines must be ventilated to a safe place by ex-proof mechanical means.
- If there is a fuel, flue gas or water leakage in the system, stop the burner and call the responsible authority.
- After commissioning the repair, maintenance work is under responsibility of user and must be done with a qualified person.
- Before operating, smell all around the appliance area for gas. Be sure to smell next to the floor because some gas is heavier than the air and will settle on the floor.

WHAT TO DO IF YOU SMELL GAS OR INSPECT FUEL LEAKAGE.

- Do not light any appliance
- Do not touch any electric item.
- Do not smoke
- Shut off the fuel valve from the main inlet to the building.
- Do not use any phone in your building
- Immediately call your local authority from neighbor's phone.

3 DECLARATION OF CONFORMITY

We hereby make the following declaration with regard to the appliance trademark ACK2, models ACK2-80, ACK2-100, ACK2-125, ACK2-150, ACK2-200, ACK2-250, ACK2-300, ACK2-350, ACK2-400, ACK2-500, ACK2-600, ACK2-700, ACK2-800, ACK2-900, ACK2-1000, ACK2-1250, ACK2-1500, ACK2-1750, ACK2-2000, ACK2-2500, ACK2-3000.

That

- The material used in this appliances have been selected that safety and proper performance of these appliances are ensured and that the materials are resistant to chemical, mechanical and thermal influences to which the appliances will be exposed during their expected service life;
- For gas-carrying parts no soft soldered joints are applied;
- Settings that should be altered have been sealed;
- No asbestos has been used;
- The components of the appliance which come into contact with food and/or water used for sanitary purposes do not impair the quality of this food and/or water;
- The components used in this appliance are CE approved;
- The installation and user's instructions, type plate and packaging inscriptions are translated into the official language of the country of destination, taking into account the national installation regulation of the country concerned;
- The electric equipment of the appliances consequently complies with the requirements of the Low Voltage Directive (73/23/EEC)
- The electric equipment of the appliances consequently complies with the requirements of the Electromagnetic Compatibility Directive (89/336/EEC)

4 GUARANTEE AND SERVICE

Provided that the principles, warnings and standards set out in the operation in this manual and taking into account the national installation regulation of the country (in the absence of such requirements, they shall be referred to EN norms, directives and codes) are complied with, your boiler shall be under the warranty for a period of 3 (three) years starting from the date of dispatch (from manufacturer) against any faults of material and workmanship.

The certificate of guarantee shall be filled out by seller and the verification of installation by a qualified (by the seller) service must be filled out and forwarded to seller for warranty purposes.

Wrong installation, maintenance and use will not be covered by guarantee. The boiler guarantee will be invalid if the boiler waterways and system water pipes are covered with debris and/or carbonate deposits from the system water and/or boiler heat exchanger parts fails because of corrosion caused by the system water.

The minimum service life for these boilers are 15 (fifteen) years. The producer and the suppliers undertake to provide service and spare parts to the boilers during said period.

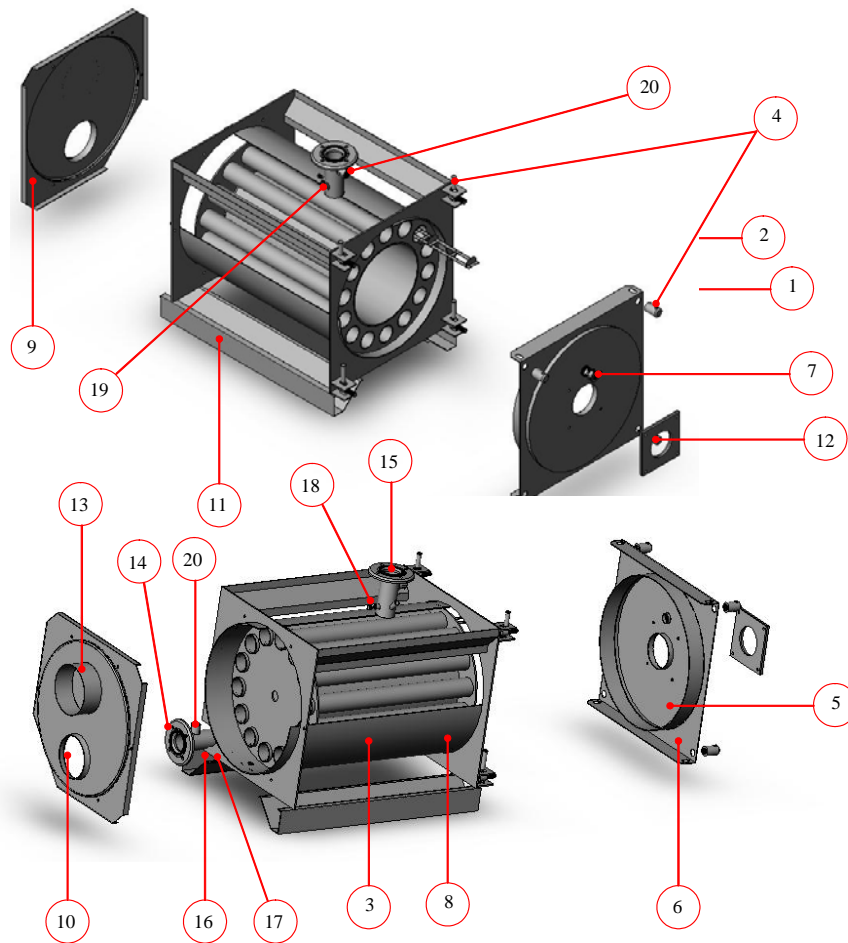
5 GENERAL SPECIFICATIONS

- ACK2 boilers are reverse flame, 2 pass, wet back, cylindrical shell type, hot water, liquid or gas fired, B₂₃ steel boilers.
- They are manufactured and tested in accordance with TS EN 303-1, by an ISO 9001-2000 registered company.
- They are economical and environmentally friendly.
- Compact design ensures easy transport into boiler rooms.
- The boilers have been specially designed and produced to perform efficient combustion with both gas and liquid fuels.
- Boiler gas side pressure loss is well below the limited values in EN standards.
- Economic and safe heating system operation through optional boiler control panels. Control Panel in Three Different Models: a) Standard Single stage boiler control panel b) Standard Two stage boiler control panel c) Weather Compensated Economy Panel.
- ACK2 boilers have 21 different capacities between 80.000-3.000.000 Kcal/h. (93 – 3488 kW) and standard working pressure is 4 bar.
- Minimum heat loss with perfect insulation.
- Wide water galleries and the return water connection is from the back bottom side provide excellent natural circulation and safe heat transfer.
- No additional intermediate flow pieces required. All necessary connections are already on the boiler.
- They have low combustion chamber loading for clean combustion with low nitrogen oxide emissions.
- Boiler front door can be opened in both directions, very useful in boiler rooms with limited space.

6 OPERATING PRINCIPLES

- These boilers have been designed to heat hot water and must be connected to a heating plant and/or a domestic hot water plant within the limits of its performance and output.
- ACK2 boilers are hot water boilers with a maximum outlet temperature of 90 °C (up to 105 optional) and a maximum allowable operation pressure of 4 bar gauge (up to 8 bar gauge optional). Return water temperatures must not be lower than 55 °C on oil and 60°C on gas firing .
- These boilers are not suitable for use as a direct water heater. Where potable or sanitary hot water is required, a matching indirect heat exchanger must be provided in the system.
- These boilers are suitable for Liquid (6 cSt at 20°C oil) and gaseous (Natural gas, Town gas, LPG) fuels. Please ask your seller for the details of the Local suitable fuels which can be fired in ACK2 series boiler.
- This boiler must be fired by a compatible burner (CE marked) certified to EN 76 (gas firing) or EN 267 (oil firing) to comply with the Boiler Efficiency Directive 92/42/EEC.
- This boiler is suitable for use in either open vented or pressurized expansion vessel heating systems. The system must have a matching expansion system.
- Second pass heat transfer combustion gas pipes have turbulators in order to maximize heat transfer to water.

7 MAIN PARTS



- 1- Combustion chamber.
- 2- Second pass combustion pipes and turbulators.
- 3- Main boiler body.
- 4- Two way hinges.
- 5- Combustion chamber door insulation.
- 6- Boiler front door
- 7- Flame monitoring glass.
- 8- Boiler insulation.
- 9- Flue box
- 10- Functional explosion cover.
- 11- Supporting feet.
- 12- Gas/liquid fuel burner.
- 13- Flue outlet
- 14- Boiler return
- 15- Boiler flow
- 16- Drain and fill
- 17- Condense outlet
- 18- Pressure sensing coupling
- 19- Temperature sensor coupling
- 20- Safety connections

8 INSTALLATION

The installation of the boilers must be performed according to the current local standards

and in addition, instructions stated below;

- All installation, assembly and maintenance work must be carried out exclusively by fully trained, professionally qualified personnel and must conform with this manual and the local codes and requirements of the authority having jurisdiction, or in the absence of such requirements, apply to the EEC directives and European norms (EN).
- This boiler must be installed in accordance with the rules in force and only in a well ventilated and frost free spaces. Top and bottom ventilation openings must be according to local codes.
- Boilers must be fired by a compatible burner certified to EN 676 (gas firing) or EN 267 (oil firing) to comply with the boiler efficiency requirement (92/42/EEC) directive and Appliances burning gaseous fuels (90/396/EEC) directive.
- This is a B₂₃ appliance so the flue gases must be connected to an adequate draught chimney, without any flue gas leakage to the boiler room.
- Control of the heating system shall enable the specified designed indoor temperatures to be achieved under the specified variation of internal loads and external climate and, protect building and equipment against frost and moisture damage when normal comfort temperature level is not required.
- Heating system shall be equipped with automatic and/or manual control devices according to current EN 12828.
- It is essential that an appropriate pump is fitted in the circulation system which must be kept in automatic operation at all the times when the boiler in use.
- It is essential that a shunt pump (anti condensate pump) and/or 3 way valve systems shall be fitted to the system in order to keep the return line temperature above the condensation values.
- The filling and make up water must be according to the specifications given in this manual. Long term water treatment is essential to the economic operation and life of both new and refurbished heating systems.
- Boilers should be installed on a non-combustible, smooth and level foundation which is at least 150 mm high and according to these manual and local codes.
- Boilers must not be installed in areas where inflammable vapors and materials are likely to be present. To avoid damage to the boilers, contamination of the combustion air by high levels of dust or halogenated hydrocarbons (e.g. Solvents, spray can propellants, cleaning agents, adhesives, etc.) must be avoided. The humidity level must not be high in boiler rooms.
- The boiler room must not be used for other purposes and must not have an open connection to the other closed living areas. Connection door must be air tight, fire resistant and self closing.
- An emergency shut down switch must be placed in a proper place outside the boiler room. This switch must cut off the fuel line and must be identified by a name plate.
- If the system is running with a fuel heavier than air and the boiler room is under ground level, then the firing system must have a flame control device and the possible leakage from fuel lines must be ventilated to a safe place by ex-proof mechanical means.

- All electrical connections must be according to current standards and wiring diagrams are given in this manual. Please pay special attention to earth connections to all electrical items in the boiler room. Never use fuel or water pipes as an earth connection.
- The boiler chimney connections should be designed according to the norms and the distance between boiler and the chimney must be minimum. The chimney connection must be executed according to the required technique; the ducts must be easily dismountable with no counter slopes, fissures, elbow curves, etc. For quick guide a Stack dimension chart is given in this manual.
- There must not be any valves between the boiler and the safety items such as high pressure safety valve, safeguard against lack of water, pressure limiter, and expansion tank. Only you can have an engineer's lockable isolating valve can be placed before the closed expansion tank for maintenance purposes.
- After the installation of the boiler all the water and fuel connections and valves must be controlled for leakage.
- For ACK2 type boilers, it is advisable to have a three-way valve between flow and return line in order to keep the water return line over 55 °C in order to overcome condensation problem.
- ACK2 boilers have condensation outlet which is on the boiler flue gas side, this outlet shall be drained with a siphon in order to prevent flue gas leakage from boiler. Condensation drain shall be according to local codes.
- ACK2 boilers, it is advisable to have the circulation pump on the flow direction at closed expansion systems and on the return line on open vented expansion systems.
- For ACK2 boilers, it is advisable to have the safety valve on flow line to the connection present on the boiler outlet pipe without any valve.
- For connection of the closed expansion tank it is advice to have on return line and a lockable valve + drain valve is advised only for servicing.
- If necessary, national regulations regarding the condensate waste disposal rules shall be applied.

8.1 SAFETY ARRANGEMENTS

Heating system shall be equipped with safety arrangements against, exceeding the maximum operating temperature and exceeding the maximum operating pressure. Safety arrangements shall be designed in accordance with the type of heating system, energy source, and the way which the heat supply is provided to the heating system, i.e. automatically controlled or manually operated. Minimum required safety arrangement is under the responsibility of the installer and must be according to local codes and/or EN 12828.

8.1.1 MINIMUM SAFETY EQUIPMENT REQUIRED FOR SEALED SYTEMS

Protection against exceeding the maximum operating temperature;
Each boiler shall be served by a **safety temperature limiter** (manual reset thermostat) including a specific sensor and the boiler temperature shall not rise by more then 10 K after switching off the heating or fuel supply line. The temperature limiter shall confirm current EN 60730-2-9 or have CE mark. If one of the boiler control panel is purchased (optional) then this item is present on all kinds of boiler control panels.

Protection against exceeding the maximum operating pressure;

Each boiler shall be served by at least one **safety valve** in order to protect the system against exceeding the maximum operating pressure. The safety valve is not a standard supply with the boiler, it must be fitted by the installer on the flow line of the boiler without any isolation valve or similar items and they must confirm prEN 1268-1 with a minimum size of DN 15. They must open at a pressure not exceeding the maximum design pressure of the system and shall be designed to prevent the maximum operating pressure from being exceeded by more than 10 %. Safety valves shall be installed so that the pressure drop on the inlet pipe does not exceed 3 % and the pressure drop of the discharge pipe does not exceed 10 % of the safety valve set pressure.

Safety valves shall discharge safely and boilers greater than 300 kW nominal heat output have special requirements, please refer to EN 12828.

Each boiler greater than **300 kW** nominal heat output shall be served by a **pressure limiter**. This is not a standard supply with the boiler; it must be fitted by the installer on the flow line of the boiler without any isolation valve or similar items. If the operating pressure of the heating system exceeds the given pressure limit, the pressure limiter shall shut-off the heating or fuel supply and interlock it against automatic restoring. Pressure limiter shall be adjusted so that it responds before the safety valve(s) operate.

Safeguard against lack of water;

Sealed (closed expansion tank systems) shall be equipped with a water level limiter or other device, e.g. minimum pressure limiter or flow controller, thus providing interlock protection against excess temperature rise on the heat emitting surface of the boiler.

Expansion vessels;

When the heating system's heat carrying medium water is heated it expands and it cause pressure rise in sealed systems so expansion vessels shall be designed to accommodate at least the maximum expansion volume of the heating water of the system including a minimal water reserve volume. The expansion vessel shall confirm to prEN 13831. For guidance on dimensioning refer to EN 12828 but the expansion vessel manufacturer's installation instructions shall be paramount.

The expansion vessel and the connection pipe to the heating system shall be dimensioned so that the temperature rise up to the maximum operating temperature does not cause a pressure rise in the system at which the pressure limiting device and safety valves respond and shall be installed in frost protected rooms or protected against freezing. Diaphragm-type expansion vessels shall be positioned to the return pipe of the boiler and shall be no shut-off device positioned between the expansion vessel and the boiler. Consideration may be given to an engineer's lockable isolating valve for maintenance purposes.

Operational requirements of sealed systems;

In order to maintain a safe and economical operation, open vented heating systems shall be equipped with:

Temperature measuring device (20 % higher than the operating temperature and mounted in the flow pipe of the system)

Pressure gauge (50 % higher than the operating pressure and mounted in the flow pipe of the system)

Devices for controlling the operation temperature to adapt the heat supply to the heat demand. The maximum set-point of the temperature controller shall not exceed the maximum operating temperature of the boiler.

Pressure maintaining control device to ensure the required minimum operating pressure of the system. This can be achieved for example by an automatic refill-set or expansion vessel linked to a low pressure limiter.

Heating system shall be equipped with devices to fill the system and provide adjustment of the water level. Connections to a drinking water supply system shall comply with prEN 806-2, e.g. back flow prevention.

An adequate supply of combustion air is important for safe and clean combustion. For open flue heating systems with a total rated output higher than 50 kW, the rule regarding the supply of combustion air is treated as satisfied, if the cross-section of the aperture leading into the open air is at least 150 cm² and is 2 cm² larger for each kW of rated output above 50 kW.

8.1.2 MINIMUM SAFETY EQUIPMENT REQUIRED FOR OPEN VENTED SYSTEMS

Expansion cisterns;

Boilers in an open vented system shall be connected to an expansion cistern, which, is installed at the highest point of the heating system. They shall be dimensioned so that changes in water volume due to heating up and cooling down can be accommodated. Open vented system expansion cisterns shall be provided with a cistern vent and overflow pipe that cannot be blocked. The overflow pipe shall be dimensioned so that it can safely drain off the maximum mass flow rate entering the system, which can be achieved by selecting the overflow pipe to be one DN-size larger than the filling pipe.

Expansion cisterns, safety pipes, open vent and overflow pipes shall be designed and arranged to protect against freezing. Installation example is given in figure

Safety pipes, feed and expansion pipes;

Boilers shall be connected to an expansion cistern and served by an open vent pipe. The expansion cistern shall be vented to the atmosphere. The feed and expansion pipe shall be connected to the lower part of the expansion cistern. Shutting off the safety pipe or the feed and expansion pipes shall not be possible.

The minimum internal diameter of the open vent safety pipe and feed and expansion pipe shall be:

Safety pipe: $d_s = 15 + 1.4 \sqrt{\Phi}$ mm (but not less than 19 mm internal diameter)

Feed and expansion pipe: $d_{fe} = 15 + 1.0 \sqrt{\Phi}$ mm

Where Φ is the nominal heat output of the boiler in kW.

Operational requirements of open vented systems;

In order to maintain a safe and economical operation, open vented heating systems shall be equipped with:

- Water level indicator

- Temperature indicator (% 20 higher than the operating temperature and mounted in the flow pipe of the system)

Devices for controlling the operation temperature to adapt the heat supply to the heat demand. The maximum set-point of the temperature controller shall not exceed the maximum operating temperature of the boiler.

Heating system shall be equipped with devices to fill the system and provide adjustment of the water level. Connections to a drinking water supply system shall comply with prEN 806-2, e.g. back flow prevention

An adequate supply of combustion air is important for safe and clean combustion. For open flue heating systems with a total rated output higher than 50 kW, the rule regarding the supply of combustion air is treated as satisfied, if the cross-section of the aperture leading into the open air is at least 150 cm² and is 2 cm² larger for each kW of rated output above 50 kW.

8.2 BURNER SELECTION

Boilers must be fired by a compatible burner certified to EN 676 (gas firing) or EN 267 (oil firing) to comply with the boiler efficiency requirement (92/42/EEC) directive and Appliances burning gaseous fuels (90/396/EEC) directive

The burner must be suitable for the respective rated output and the resistance on the flue gas side of the boiler. The material of the burner head must be suitable for operating temperatures of at least 500 C.

Boiler combustion chamber dimensions and flue gas side resistances are according to the current regulations.

BURNER INSTALLATION

The burner should be installed to the hinged boiler front door by the help of burner plate, which is the standard delivery.

The ballast tube of the burner must protrude from the thermal insulation on the boiler door. If the burner ballast tube to be used is short or very long then verify perfect functioning by burner and boiler manufacturer.

If the burner ballast tube diameter is less than the boiler door please fill the gap with thermal insulation material supplied by the boiler.

Flange connections shall be air tight always. If there will be combustion hot gas leakage from the flanges to the boiler room it can be poisonous and hot gases will overheat the boiler front door.

Burner shall be adjusted according to the boiler output. In two stage or modulating burners low fire output adjustment be sure that flue gas temperature is not lower than the condensation point of flue gas.

8.3 FUELS

ACK2 boilers can be fired with the fuels;

Oil (according to DIN 51 603 and/or to local limitations)

Natural gas, LPG and Town gas (according to EN 437 and/or to local limitations)

8.4 FLUE GAS EXHAUST SYSTEM.

ACK2 boilers are **B₂₃** type appliance so the flue gases must be connected to an adequate draught chimney, without any flue gas leakage to the boiler room. Chimney design must be according to local codes. Chimney inside diameter, height, material, thermal insulation, strength shall be according the flue gas specifications and shall not cause dangerous high pressures.

0 to -0.3 mbar vacuum shall be observed at the flue gas exit of boiler.
Some informative diagrams are given for quick reference in annex

Effective chimney height is the height difference between boiler flue gas exit and chimney end.

Flue gas ducts between boiler and chimney shall not be longer then ¼ of the effective height but anyhow it shall not be longer then 7 m and shall not be shorter then 0.6 m. There can be maximum two 90° elbow (avoid sharp turns)

Flue gas ducts shall not have any downward slope. It is advised to have 10° slope upwards and enter the chimney with an angle of 45°.

8.5 BOILER WATER AND MAKE UP WATER FOR HOT WATER BOILERS

According to **EN 12953-10:2003** (Shell boilers: Requirements for feed water and boiler water quality.

Parameter	Unit	Make up Boiler Water	Boiler water
Operating pressure	Bar	Total range	
Appearance	-	Clear, free from suspended solids, no stable foam	
Direct conductivity at 25 °C	µS/cm	< 1500	
pH value at 25 °C	-	>7.0	9.0 to 11,5 ^a
Total hardness (Ca + Mg)	mmol/l	< 0,05	
Iron concentration	mg/l	< 0,2	
Composite alkalinity	mmol/l	-	<5
Oil/grease concentration	mg/l	<1	-
Organic substances (as TOC)	-	See footnote ^b	

^a If non-ferrous materials are present in the system, e.g aluminum, they may require lower pH value and direct conductivity, however, the protection of the boiler has priority.

^b Organic substances are generally a mixture of several different compounds. The composition of such mixtures and the behavior of their individual components under the conditions of boiler operation are difficult to predict. Organic substances may be decomposed to form carbonic acid or other acidic decomposition products which increase the acid conductivity and cause corrosion or deposits. They also may lead to foaming and/or priming which shall be kept as low as possible.

Note : During boiler economic life, the total make up water volume can not be more than 3 times of the total system water.

Guarantee will not be valid, if the boiler is out of service because of corrosion, sludge formation and deposits

In order to prevent corrosion special care needed for oxygen infusion to the heating system water side. Possible points for oxygen infusion are from open vented cisterns, negative pressure points on the system and some gas permeable system items like plastic pipes.

9 START UP

First start up work shall be carried out exclusively by fully trained, professionally qualified personnel.

Before first start up check that;

- There is a copy of the boiler and burner instructions in the boiler room.
- The boiler name plate and manual specifications and power supply network and other system need specifications correspond. (electric supply, fuel, water, boiler and burner output, system pressure, circulating pipes ...)
- The air inlet and outlet supply openings are correctly sized and free from obstacles.
- The flue gas exhaust system is correctly fitted and sized.
- All the system control and security devices are present and installed according to the current regulations and working properly.
- The burner output and fuel type is compatible with the boiler and system specifications.
- The flue gas turbulators are present in all the second pass pipes and properly placed.
- Control the boiler gas side seals are not damaged and fixed properly. (boiler front door, burner mounting plates, smoke box, flame monitoring glass)

In starting a new installation all the fuel and water pipes, boiler and all the other heating system items must be flushed and free from deposits.

Before filling the system with water control the expansion tank pre charge pressure in sealed systems.

Open all the necessary valves for filling

Fill the heating system with water (water specifications shall be according to boiler manuals) very slowly according to the air bleeding capacity of the components.

In open vented systems fill the system up expansion cistern's proper level. In sealed systems fill the system up to predefined pressure.

Bleed all the air in the water side. Any air pockets have been eliminated.

Run the circulating pumps and control that they are working properly.

Control all the possible water leakage points.

Check all security and operation items are working properly and set to system needs. If the safety valve is not factory adjusted, set it according to system need and be sure that it is working properly.

Control the fuel system installation

Bleed all the air in fuel system.

Before firing the burner, be sure that system is full of water and all control items are set to desired value and working properly.

Check the fuel pressure, temperature and fuel line leakages before running the burner.

Run the burner and adjust it to proper output according to boiler needs.

Analyze the flue gas and be sure that emission levels of CO, NO_x, soot, CO₂ or O₂ are according to current regulations.

For reference (current and local regulations has priority)

FUEL	% CO ₂	CO (mg/kWh)	NO _x (mg/kWh)
Gas	≥ 10	≤ 100	≤ 170
LPG	≥ 10	≤100	≤ 230
Oil	≥ 13	≤110	≤ 250

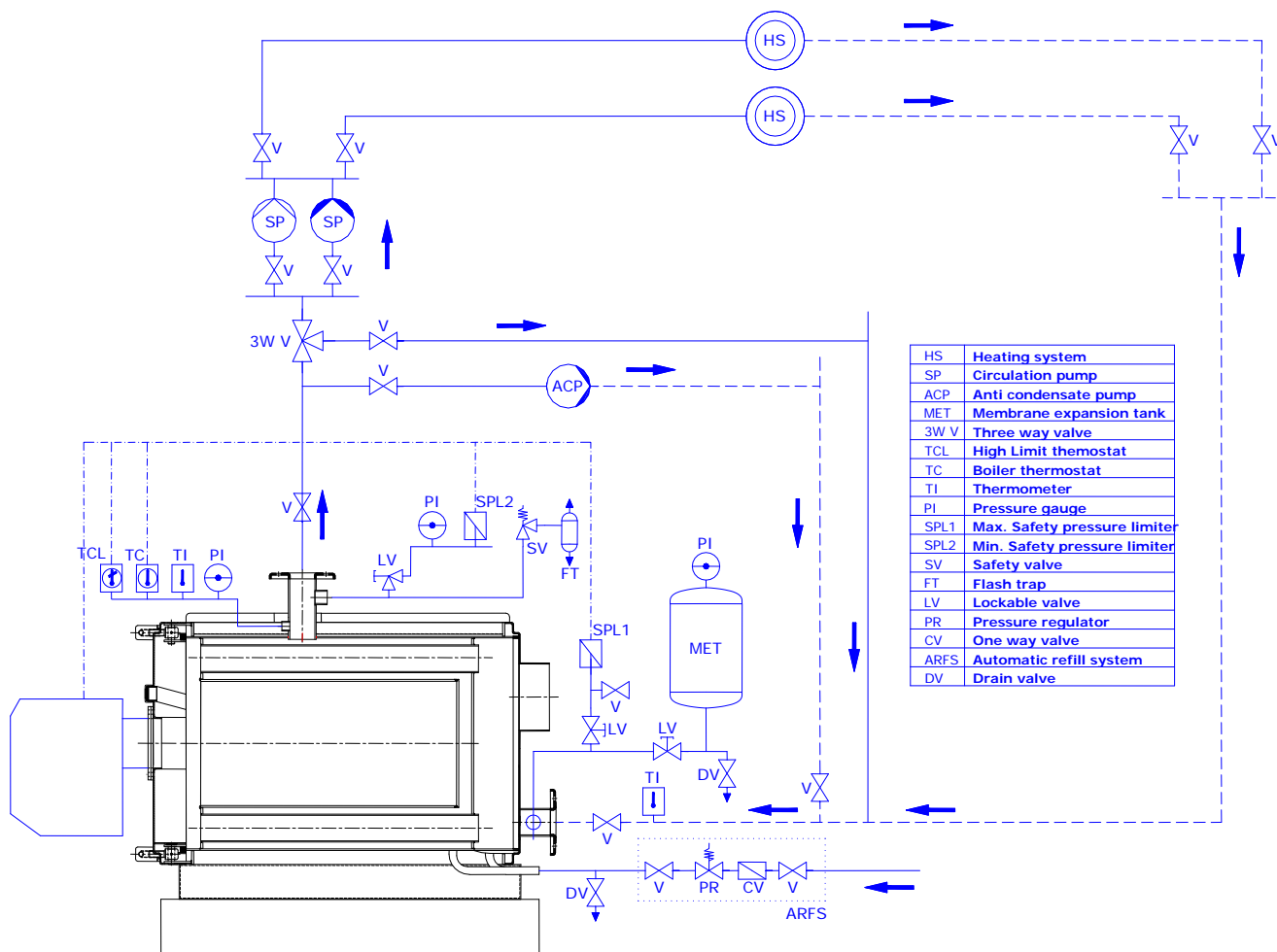
Note: Emission values shall be according to current and local limitations. In absence of local limitations refer to current EN 677 for gas firing and current EN 300-2 for oil firing. In correct adjustments can cause damage to people, animals, nature and also loss of energy.

After running the burner heat the system up to 85 °C and again bleed the air in the water side. After first heating most of the dissolved air in the system water will be free for bleeding.

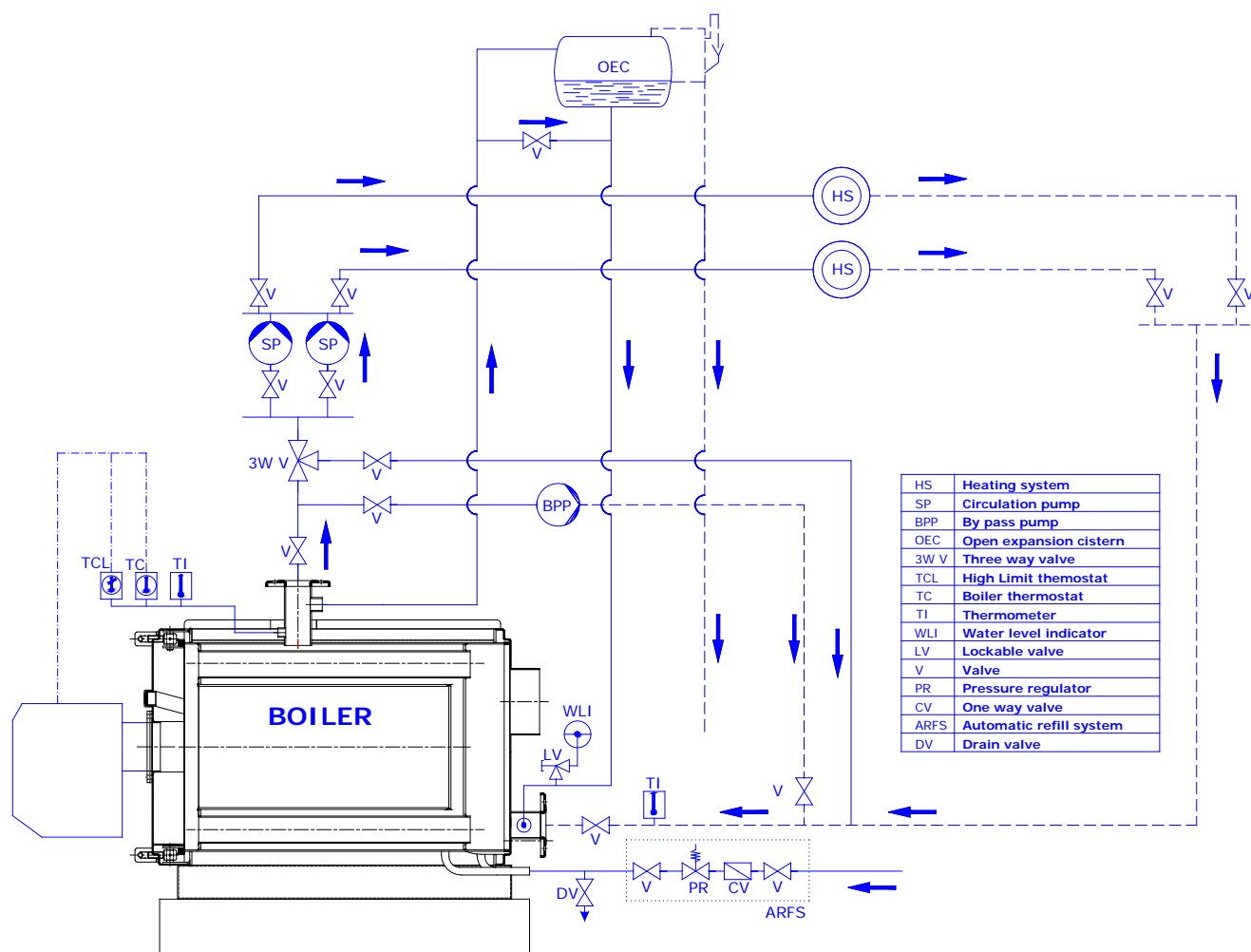
Control all the security and operation devices for proper operation and set values are according to system needs again.

Call the owner or operator of the boiler house and give the necessary information for proper operation of the system and warn them about the possible dangers and limitations and what will they do in case of emergency.

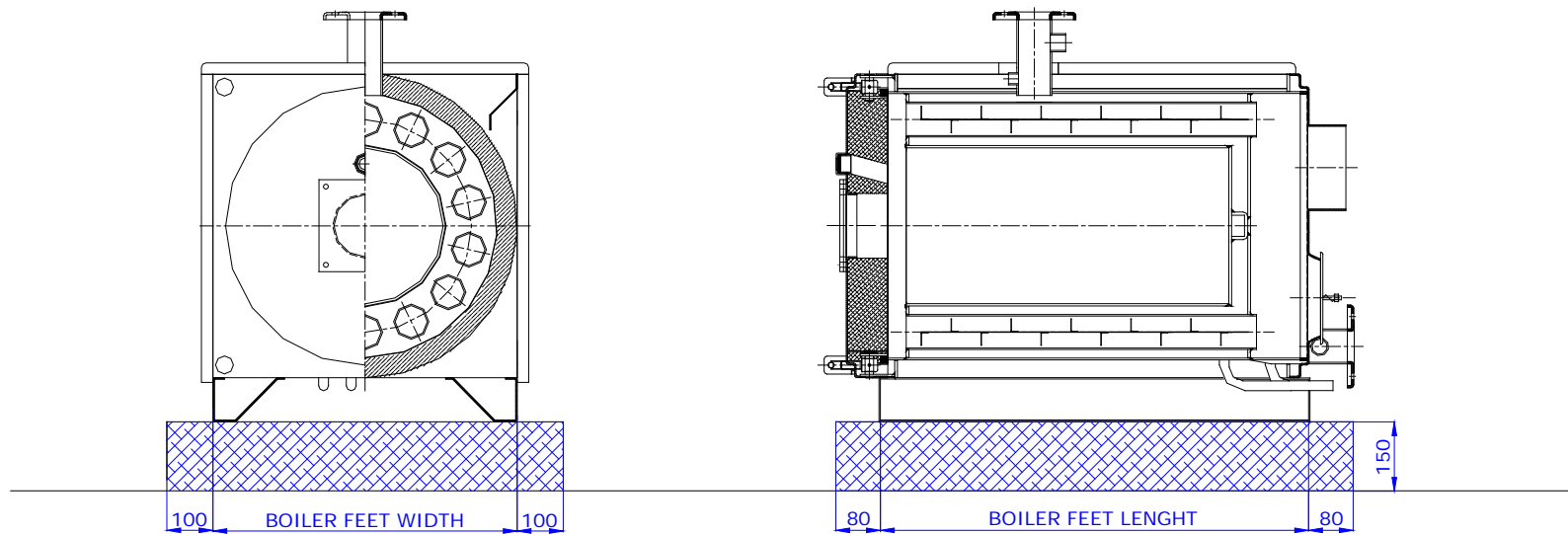
10 ANEX



TYPICAL SAFETY EQUIPMENT AND HYDRAULIC ARRANGEMENT FOR SEALED (CLOSED EXPANSION) SYSTEMS

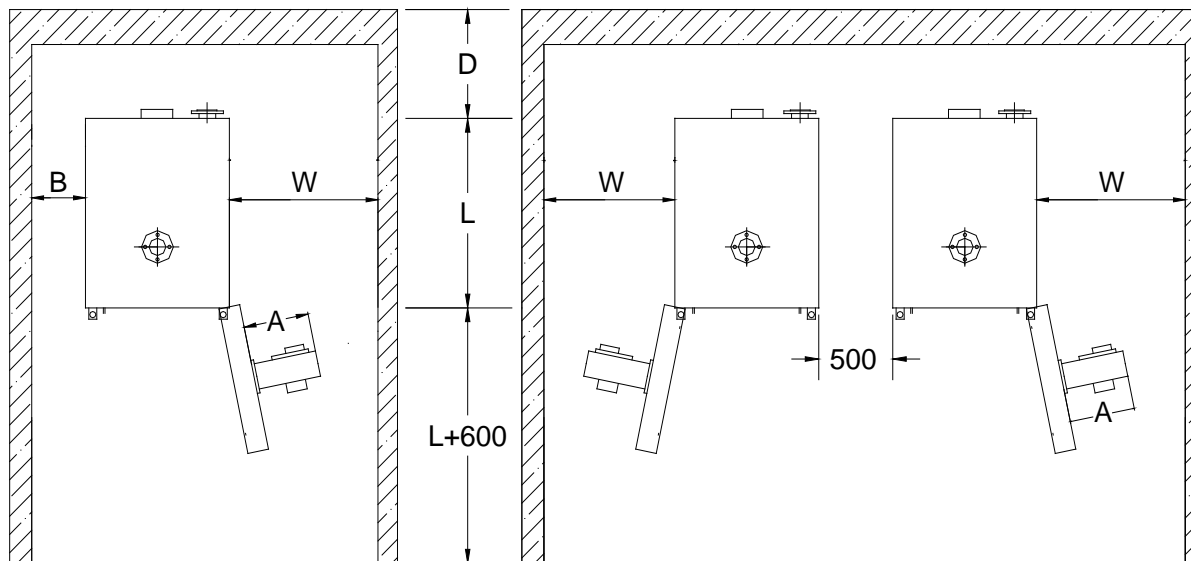


**TYPICAL SAFETY EQUIPMENT AND HYDROULIC ARRANGEMENT
FOR OPEN VENTED (OPEN EXPANSION CISTERN) SYSTEMS**



- BOILER FOUNDATION SHALL BE ENOUGH STRENGHT TO CARRY THE BOILER FULL WITH WATER AND ACCESSORIES
- BOILER FOUNDATION SHALL BE FROM NON CONBUSTIBLE METERIALS
- BOILER FOUNDATION SURFACE SHALL BE LEVEL AND SMOOTH

- BOILER FOUNDATION



A : Burner lenght.

B : 600 mm minimum.

W : A + 200 mm minimum.

D : $L/2 + 500$ (min 600 mm)

L : Lenght of boiler.

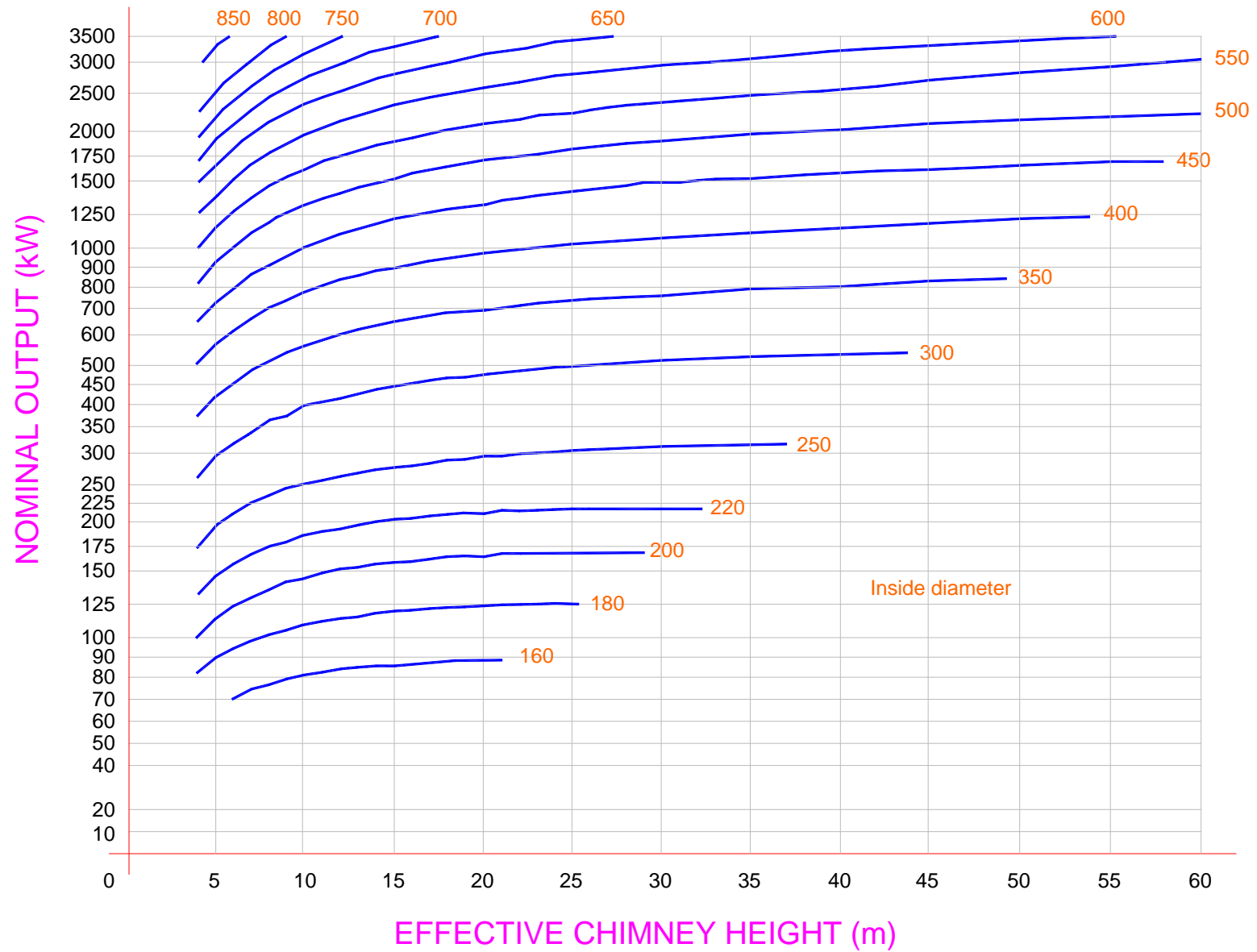
H : Height of the boiler room must be minimum 1000 mm
heigher then the boiler height.

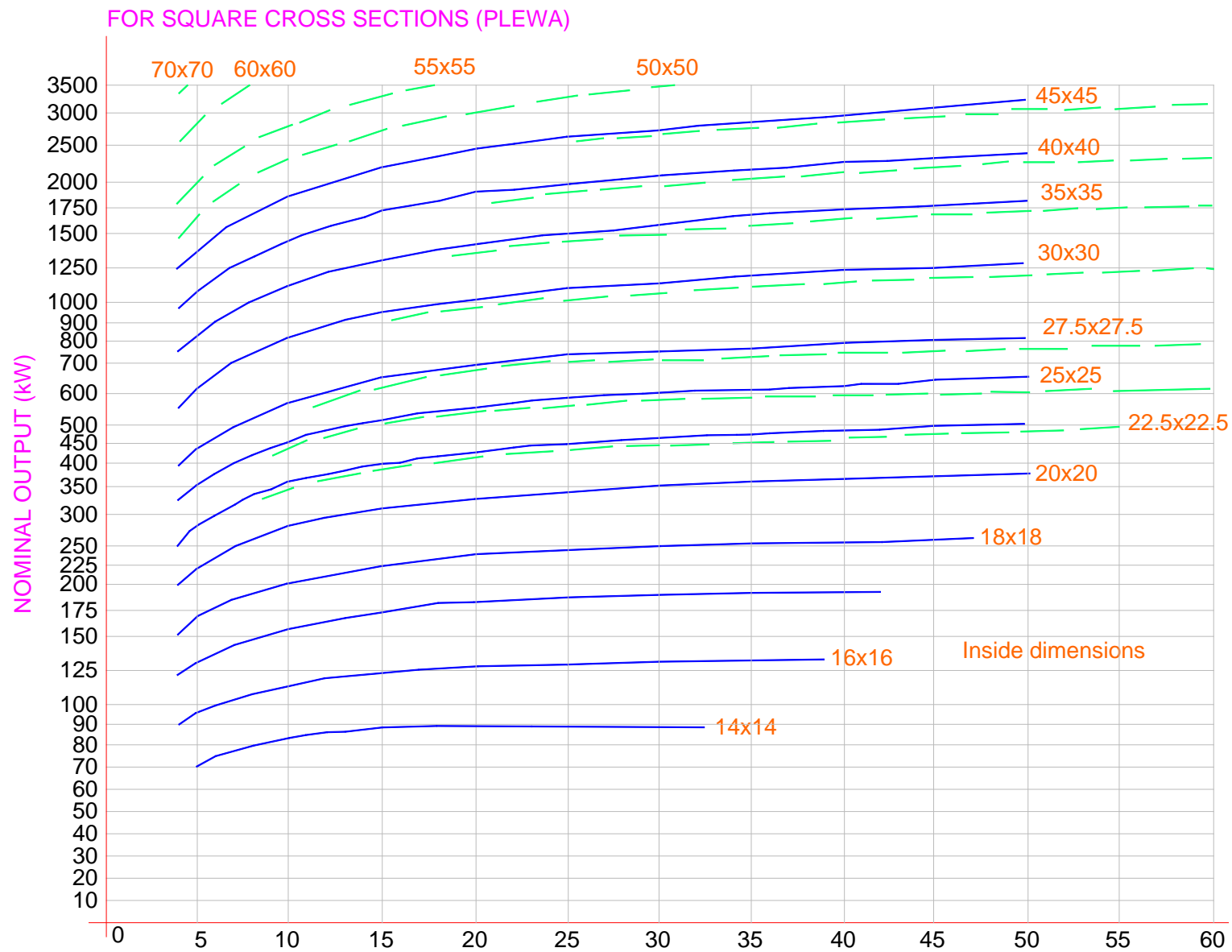
Note : These dimensions are recomendations only.

They can be changed according to local standarts.

BOILER ROOM LAYOUT

FOR CIRCULAR CROSS SECTION (SCHIEDEL)





ACK2 OIL/GAS FIRED HOT WATER BOILERS

ALARKO - GAS BURNER SELECTION CHART

Boiler	Net Heat	Gross Heat	Back pressure	Burner type		Burner exploitation Percentage	Blast tube Length Required.	Length	Diameter (Boiler) Ø	Diameter (Burner) Ø				
type	(kw)	(kw)	(mbar)	type	model	%	mm	Standard (S) blast tube (mm)	Boiler opening for burner (mm)	Burner blast tube (mm)	Combustion chamber diameter mm	Combustion chamber length mm	Combustion chamber Volume (m ³)	Thermal load (kW/m ³)
ACK2-80	93	102	0,5	ALG	16	69	150	60..143	130	108	339	950	0,0857	1.190
ACK2-100	116	128	0,6	ALG	16	87	150	60..143	130	108	339	950	0,0857	1.493
ACK2-125	145	160	0,7	ALG	27 or 27/2	83 or 81	150	100..265	160	140	450	950	0,1511	1.059
ACK2-150	175	193	1,2	ALG	27/2	97	150	100..265	160	140	450	950	0,1511	1.277
ACK2-200	232	255	1,5	ALG	36 or 36/2	81 or 75	150	110..350	160	140	548	1040	0,2453	1.040
ACK2-250	290	319	1,6	ALG	36/2	93	150	110..350	180	140	548	1040	0,2453	1.300
ACK2-300	349	384	1,4	ALG	60/2	68	150	357..391	180	163	634	1270	0,4009	958
ACK2-350	407	448	2,0	ALG	60/2	81	150	357..391	180	163	634	1270	0,4009	1.117
ACK2-400	465	512	2,2	ALG	60/2	93	150	357..391	180	163	634	1500	0,4735	1.081
ACK2-500	581	639	2,1	ALG	77/2	89	150	357..391	205	172	700	1453	0,5592	1.143
ACK2-600	698	768	2,8	N/A	N/A						700	1453	0,5592	1.373
ACK2-700	814	895	2,6	N/A	N/A						860	1730	1,0049	891
ACK2-800	930	1023	2,8	N/A	N/A						860	1730	1,0049	1.018
ACK2-900	1046	1151	2,9	N/A	N/A						860	1730	1,0049	1.145
ACK2-1000	1163	1279	3,0	N/A	N/A						860	1730	1,0049	1.273
ACK2-1250	1453	1598	3,1	N/A	N/A						880	2145	1,3046	1.225
ACK2-1500	1744	1918	3,6	N/A	N/A						880	2490	1,5144	1.266
ACK2-1750	2034	2237	4,2	N/A	N/A						1000	2400	1,8850	1.187
ACK2-2000	2325	2558	4,7	N/A	N/A						1000	2650	2,0813	1.229
ACK2-2500	2907	3198	5,2	N/A	N/A						1050	2640	2,2860	1.399
ACK2-3000	3488	3837	5,5	N/A	N/A						339	950	0,0857	1.190

ACK2 OIL/GAS FIRED HOT WATER BOILERS

LAMBORGHINI - GAS BURNER SELECTION CHART

Boiler	Net Heat	Gross Heat	Back pressure	Burner type		Burner exploitation Percentage	Blast tube Length Required.	Length	Diameter Ø	Diameter Ø				
type	(kw)	(kw)	(mbar)	type	model	%	mm Minimum	Standard (S) blast tube (mm)	Boiler opening for burner (mm)	Burner blast tube (mm)	Combustion chamber diameter mm	Combustion chamber length mm	Combustion chamber Volume (m³)	Thermal load (kW/m³)
ACK2-80	93	102	0,5	EM	16-E or 16/2-E	62 or 71	150	60..150	130	108	339	950	0,0857	1.190
ACK2-100	116	128	0,6	EM	16-E or 16/2-E	88 or 90	150	60..150	130	108	339	950	0,0857	1.493
ACK2-125	145	160	0,7	EM	26-E or 26/2-E	70 or 73	150	100..265	160	140	450	950	0,1511	1.059
ACK2-150	175	193	1,2	EM	26-E or 26/2-E	87 or 90	150	100..265	160	140	450	950	0,1511	1.277
ACK2-200	232	255	1,5	EM	35-E or 40/2-E	89 or 90	150	120..310	160	140	548	1040	0,2453	1.040
ACK2-250	290	319	1,6	EM	50/2-E	63	150	140..400	180	170	548	1040	0,2453	1.300
ACK2-300	349	384	1,4	EM	50/2-E or 70/2-E	74 or 52	150	140..400	180	170	634	1270	0,4009	958
ACK2-350	407	448	2,0	EM	50/2-E or 70/2-E	90 or 63	150	140..400	180	170	634	1270	0,4009	1.117
ACK2-400	465	512	2,2	PM	70/2-E	73	150	140..400	180	170	634	1500	0,4735	1.081
ACK2-500	581	639	2,1	PM	70/2-E	90	150	140..400	205	170	700	1453	0,5592	1.143
ACK2-600	698	768	2,8	PM	140/2-E	66	200	200..460	205	197	700	1453	0,5592	1.373
ACK2-700	814	895	2,6	PM	140/2-E	66	200	200..460	250	197	860	1730	1,0049	891
ACK2-800	930	1023	2,8	PM	140/2-E	88	200	200..460	250	197	860	1730	1,0049	1.018
ACK2-900	1046	1151	2,9	PM	140/2-E or 210/2-E	99 or 70	200	200..460	250	197 or 228	860	1730	1,0049	1.145
ACK2-1000	1163	1279	3,0	PM	210/2-E	77	200	200..460	250	228	860	1730	1,0049	1.273
ACK2-1250	1453	1598	3,1	PM	210/2-E	97	200	200..460	250	228	880	2145	1,3046	1.225
ACK2-1500	1744	1918	3,6	PM	310/2-E	71	200	250..550	280	256	880	2490	1,5144	1.266
ACK2-1750	2034	2237	4,2	PM	310/2-E	84	200	250..550	280	256	1000	2400	1,8850	1.187
ACK2-2000	2325	2558	4,7	PM	310/2-E or 430/2-E	97 or 61	200	250..550	350	256 or 303	1000	2650	2,0813	1.229
ACK2-2500	2907	3198	5,2	PM	430/2-E	77	200	250..600	350	303	1050	2640	2,2860	1.399
ACK2-3000	3488	3837	5,5	PM	430/2-E	92	200	250..600	350	303	339	950	0,0857	1.190

ACK2 OIL/GAS FIRED HOT WATER BOILERS

ALARCO - OIL BURNER SELECTION CHART

Boiler	Net Heat	Gross Heat	Back pressure	Burner type		Burner exploitation Percentage	Blast tube Length Required.	Length	Diameter Ø	Diameter Ø				
type	(kW)	(kW)	(mbar)	Type	model	%	mm	Standard (S) blast tube (mm)	Boiler opening for burner (mm)	Burner blast tube (mm)	Combustion chamber diameter mm	Combustion chamber length mm	Combustion chamber Volume (m ³)	Thermal load (kW/m ³)
ACK2-80	93	102	0,5	ALM	14	64	150	120..235	130	130	339	950	0,0857	1.190
ACK2-100	116	128	0,6	ALM	14	82	150	120..235	130	130	339	950	0,0857	1.493
ACK2-125	145	160	0,7	ALM	22	65	150	60..200	160	120	450	950	0,1511	1.059
ACK2-150	175	193	1,2	ALM	22	83	150	60..200	160	120	450	950	0,1511	1.277
ACK2-200	232	255	1,5	ALM	30 or 30/2	78 or 75	150	70..290	160	133	548	1040	0,2453	1.040
ACK2-250	290	319	1,6	ALM	30/2	94	150	70..290	180	133	548	1040	0,2453	1.300
ACK2-300	349	384	1,4	ALM	40/2	87	150	120..310	180	147	634	1270	0,4009	958
ACK2-350	407	448	2,0	ALM	50 or 60/2	77 or 67	150	181..203	180	159	634	1270	0,4009	1.117
ACK2-400	465	512	2,2	ALM	50 or 60/2	89 or 75	150	181..203	180	159	634	1500	0,4735	1.081
ACK2-500	581	639	2,1	ALM	59 OR60/2	91 or 94	150	181..203	205	159	700	1453	0,5592	1.143
ACK2-600	698	768	2,8	ALM	76/2	84	200	181..211	205	181	700	1453	0,5592	1.373
ACK2-700	814	895	2,6	ALM	76/2	99	200	181.211	250	181	860	1730	1,0049	891
ACK2-800	930	1023	2,8	MS	7-1VZDU	74	200	223	250	200	860	1730	1,0049	1.018
ACK2-900	1046	1151	2,9	MS	7-1VZDU	84	200	223	250	200	860	1730	1,0049	1.145
ACK2-1000	1163	1279	3,0	MS	7-1VZDU or 8-1VZDU	93 or 50	200	223 or 242	250	200 or 240	860	1730	1,0049	1.273
ACK2-1250	1453	1598	3,1	MS	8-1VZDU	65	200	242	250	240	880	2145	1,3046	1.225
ACK2-1500	1744	1918	3,6	MS	8-1VZDU	79	200	242	280	240	880	2490	1,5144	1.266
ACK2-1750	2034	2237	4,2	MS	8-1VZDU	93	200	242	280	240	1000	2400	1,8850	1.187
ACK2-2000	2325	2558	4,7	MS	9-VZDU	88	200	225	350	265	1000	2650	2,0813	1.229
ACK2-2500	2907	3198	5,2	MS	10-VZDU	89	200	235	350	265	1050	2640	2,2860	1.399
ACK2-3000	3488	3837	5,5	RMS	10 VDMU	100	200	235	350	265	339	950	0,0857	1.190

ACK2 OIL/GAS FIRED HOT WATER BOILERS

CIB UNIGAZ - GAS BURNER SELECTION CHART

Boiler	Net Heat	Gross Heat	Back pressure	Burner type		Burner exploitation Percentage	Blast tube Length Required.	Length	Diameter Ø	Diameter Ø				
type	(kw)	(kw)	(mbar)	type	model	%	mm Minimum	Standard (S) blast tube (mm)	Boiler opening for burner (mm)	Burner blast tube (mm)	Combustion chamber diameter mm	Combustion chamber length mm	Combustion chamber Volume (m³)	Thermal load (kW/m³)
ACK2-80	93	102	0,5	S10	M-.AB.S.IT.A.0.20	74	150	180	130	108(113)	339	950	0,0857	1.190
ACK2-100	116	128	0,6	S10	M-.AB.S.IT.A.0.20	99	150	180	130	108(113)	339	950	0,0857	1.493
ACK2-125	145	160	0,7	S18	M-.AB.S.IT.A.0.25	100	150	205	160	126	450	950	0,1511	1.059
ACK2-150	175	193	1,2	NG350	M-.PR.M.IT.A.0.xx	63	150	177	160	125 (157)	450	950	0,1511	1.277
ACK2-200	232	255	1,5	NG350	M-.PR.M.IT.A.0.xx	82	150	177	160	125 (157)	548	1040	0,2453	1.040
ACK2-250	290	319	1,6	NG400	M-.PR.M.IT.A.0.xx	87	150	195	180	144 (157)	548	1040	0,2453	1.300
ACK2-300	349	384	1,4	NG550	M-.PR.S.IT.A.0.xx	73	150	252	180	155(168)	634	1270	0,4009	958
ACK2-350	407	448	2,0	NG550	M-.PR.S.IT.A.0.xx	87	150	252	180	155(168)	634	1270	0,4009	1.117
ACK2-400	465	512	2,2	NG550	M-.PR.S.IT.A.0.xx	98	150	252	180	155(168)	634	1500	0,4735	1.081
ACK2-500	581	639	2,1	P60	M-.AB.S.IT.A.0.xx	83	150	345	205	184	700	1453	0,5592	1.143
ACK2-600	698	768	2,8	P65	M-.AB.S.IT.A.0.xx	92	200	325	205	184(198)	700	1453	0,5592	1.373
ACK2-700	814	895	2,6	P72	M-.AB.S.IT.A.0.xx	76	200	385	250	234	860	1730	1,0049	891
ACK2-800	930	1023	2,8	P72	M-.AB.S.IT.A.0.xx	87	200	385	250	234	860	1730	1,0049	1.018
ACK2-900	1046	1151	2,9	P72	M-.AB.S.IT.A.0.xx	97	200	385	250	234	860	1730	1,0049	1.145
ACK2-1000	1163	1279	3,0	P72	M-.AB.S.IT.A.1.xx	86	200	385	250	234	860	1730	1,0049	1.273
ACK2-1250	1453	1598	3,1	P72	M-.AB.S.IT.A.1.xx	99	200	385	250	234	880	2145	1,3046	1.225
ACK2-1500	1744	1918	3,6	P91	M-.PR.S.IT.A.1.xx	85	200	490	280	265	880	2490	1,5144	1.266
ACK2-1750	2034	2237	4,2	P91	M-.PR.S.IT.A.1.xx	100	200	490	280	265	1000	2400	1,8850	1.187
ACK2-2000	2325	2558	4,7	P510	M-.PR.S.IT.A.1.xx	61	200	520	350	340	1000	2650	2,0813	1.229
ACK2-2500	2907	3198	5,2	P510	M-.PR.S.IT.A.1.xx	76	200	520	350	340	1050	2640	2,2860	1.399
ACK2-3000	3488	3837	5,5	P510	M-.PR.S.IT.A.1.xx	94	200	520	350	340	339	950	0,0857	1.190

ACK2 OIL/GAS FIRED HOT WATER BOILERS

CIB UNIGAZ - OIL BURNER SELECTION CHART

Boiler	Net Heat	Gross Heat	Back pressure	Burner type		Burner exploitation Percentage	Blast tube Length Required.	Length	Length	Diameter Ø				
type	(kw)	(kw)	(mbar)	type	model	%	mm Minimum	Standard (S) blast tube (mm)	Extended (L) blast tube (mm)	blast tube (mm)	Combustion chamber diameter mm	Combustion chamber length mm	Combustion chamber Volume (m³)	Thermal load (kW/m³)
ACK2-80	93	102	0,5	G10	G.TN.L.IT.A	87	150	80	200	114	339	950	0,0857	1.190
ACK2-100	116	128	0,6	G18	G.SP.L.IT.A	68	150	-	200	114	339	950	0,0857	1.493
ACK2-125	145	160	0,7	G18	G.SP.L.IT.A	84	150	-	200	114	450	950	0,1511	1.059
ACK2-150	175	193	1,2	G18	G.SP.L.IT.A	100	150	-	200	114	450	950	0,1511	1.277
ACK2-200	232	255	1,5	LO400	G-.AB.M.IT.A	65	150	194	324	133 (143)	548	1040	0,2453	1.040
ACK2-250	290	319	1,6	LO400	G-.AB.M.IT.A	85	150	194	324	133 (143)	548	1040	0,2453	1.300
ACK2-300	349	384	1,4	LO400	G-.AB.M.IT.A	100	150	194	324	133 (143)	634	1270	0,4009	958
ACK2-350	407	448	2,0	LO550	G-.AB.S.IT.A	88	150	252	352	144(155)	634	1270	0,4009	1.117
ACK2-400	465	512	2,2	LO550	G-.AB.S.IT.A	99	150	252	352	144(155)	634	1500	0,4735	1.081
ACK2-500	581	639	2,1	PG60	G-.AB.S.IT.A	100	150	310	460	198	700	1453	0,5592	1.143
ACK2-600	698	768	2,8	PG70	G-.AB.S.IT.A	75	200	310	460	198	700	1453	0,5592	1.373
ACK2-700	814	895	2,6	PG70	G-.AB.S.IT.A	87	200	310	460	198	860	1730	1,0049	891
ACK2-800	930	1023	2,8	PG70	G-.AB.S.IT.A	99	200	310	460	198	860	1730	1,0049	1.018
ACK2-900	1046	1151	2,9	PG80	G-.AB.S.IT.A	78	200	340	490	218	860	1730	1,0049	1.145
ACK2-1000	1163	1279	3,0	PG80	G-.AB.S.IT.A	87	200	340	490	218	860	1730	1,0049	1.273
ACK2-1250	1453	1598	3,1	PG91	G-.AB.S.IT.A	78	200	300	475	238	880	2145	1,3046	1.225
ACK2-1500	1744	1918	3,6	PG91	G-.AB.S.IT.A	93	200	300	475	238	880	2490	1,5144	1.266
ACK2-1750	2034	2237	4,2	PG92	G-.AB.S.IT.A	89	200	295	465	266	1000	2400	1,8850	1.187
ACK2-2000	2325	2558	4,7	PG510	G-.PR.S.IT.A	66	200	300	520	329	1000	2650	2,0813	1.229
ACK2-2500	2907	3198	5,2	PG510	G-.PR.S.IT.A	82	200	300	520	329	1050	2640	2,2860	1.399
ACK2-3000	3488	3837	5,5	PG510	G-.PR.S.IT.A	98	200	300	520	329	339	950	0,0857	1.190

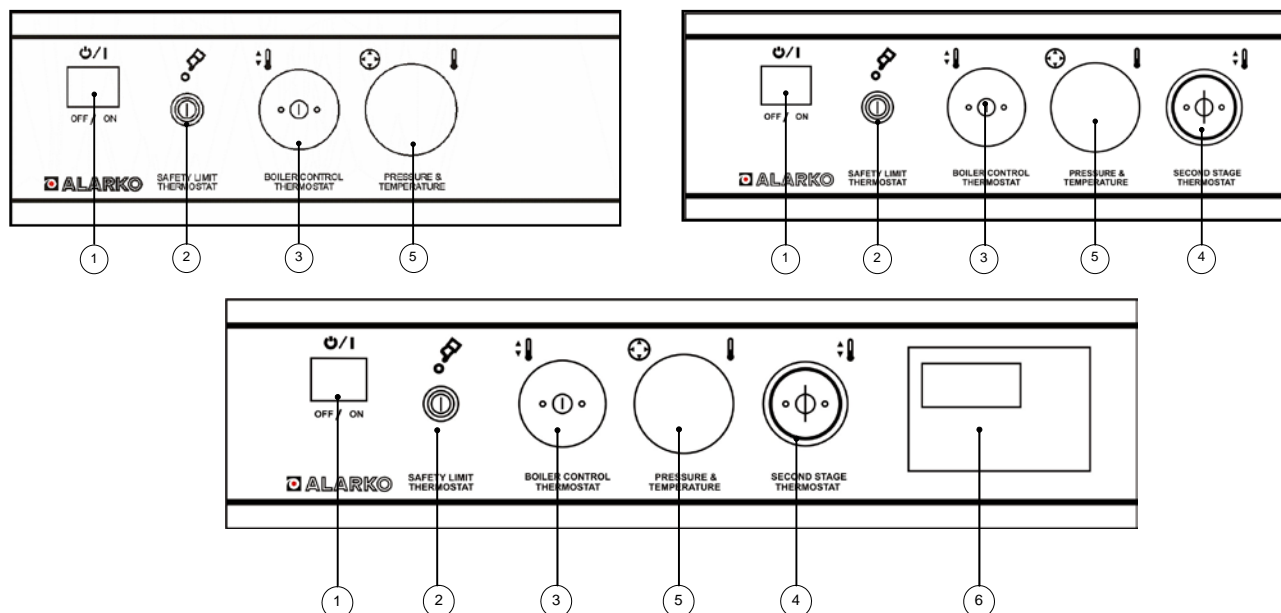
TECHNICAL SPECIFICATIONS OF ACK2 TYPE BOILERS

Range of Temperature Control	°C	55-90
Boiler Type		Hot Water, Two Pass, Reversal Flame, Steel, B 23
Fuel Type		Oil (6 cST at 20 °C)
		Gaseous (Natural Gas, Town Gas, LPG)
	Nominal Output °C	170-190
Exit Flue Gas Temperature °C	Partial Output °C	120-140
Required Draught	mbar	-0,3-0

Specifications	Unit	BOILER TYPE									
		ACK2-80	ACK2-100	ACK2-125	ACK2-150	ACK2-200	ACK2-250	ACK2-300	ACK2-350	ACK2-400	ACK2-500
Combustion Chamber Pressure	mbar	0,5	0,6	0,8	1,2	1,5	1,6	1,4	2	2,2	2,1
Exit Flue Gas Mass Flow Rate	kg/h	155	195	242	293	387	484	582	679	775	968
Water Resistance	mbar	4	6	10	10	12	14	14	15	15	16
Heat Input	kW	102	128	160	193	255	319	384	448	512	639
	kcal/h	88.000	110.000	137.500	165.000	220.000	275.000	330.000	385.000	440.000	550.000
Nominal Heat Output	kW	93	116	145	175	232	290	349	407	465	581
	kcal/h	80.000	100.000	125.000	150.000	200.000	250.000	300.000	350.000	400.000	500.000
Standby Loss	%	0,42	0,42	0,33	0,33	0,32	0,28	0,27	0,25	0,24	0,17
Gas Volume	m³	0,126	0,137	0,219	0,234	0,330	0,350	0,525	0,545	0,639	0,811
Combustion Chamber Inner Dia.	mm	339	339	450	450	548	548	634	634	700	700
Combustion Chamber Length	mm	950	950	950	950	1040	1040	1270	1270	1500	1453
Combustion Chamber Volume	m³	0,086	0,086	0,151	0,151	0,245	0,245	0,401	0,401	0,474	0,559
Boiler Height	mm	890	890	1029	1029	1104	1104	1305	1305	1305	1511
Boiler Width	mm	700	700	840	840	923	923	1040	1040	1040	1240
Boiler Length	mm	1350	1350	1329	1329	1425	1425	1734	1734	1734	2005
Exit Flue Gas Connection Dia.	mm	200	200	200	200	250	250	300	300	300	400
Exit Flue Gas Connection Height	mm	555	555	625	625	744	744	821	821	821	956
Inlet Flange	-	2"	2"	NW 65	NW 65	NW 65	NW 65	NW 80	NW 80	NW 80	NW 100
Exit Flange	-	2"	2"	NW 65	NW 65	NW 65	NW 65	NW 80	NW 80	NW 80	NW 100
Filling and Drain Pipes	inch	¾"	¾"	¾"	¾"	¾"	¾"	¾"	¾"	¾"	¾"
Expansion Tank Outlet	inch	1½"	1½"	1½"	1½"	1½"	1½"	1½"	2"	2"	2"
Expansion Tank Inlet	inch	1"	1"	1"	1"	1½"	1½"	1½"	1½"	1½"	1½"
Weight	kg	304	330	426	445	534	561	865	899	993	1323
Water Content	lt	132	119	175	157	193	169	290	266	311	623

Specifications	Unit	BOILER TYPE										
		ACK2-600	ACK2-700	ACK2-800	ACK2-900	ACK2-1000	ACK2-1250	ACK2-1500	ACK2-1750	ACK2-2000	ACK2-2500	ACK2-3000
Combustion Chamber Pressure	mbar	2,8	2,6	2,8	2,9	3	3,1	3,6	4,2	4,7	5,2	5,5
Exit Flue Gas Mass Flow Rate	kg/h	1168	1368	1558	1752	1942	2429	2900	3400	3886	4859	5830
Water Resistance	mbar	16	18	20	22	22	28	31	35	46	48	50
Max Heat Input	kW	768	895	1023	1151	1279	1598	1918	2237	2558	3198	3837
	kcal/h	660.000	770.000	880.000	990.000	1.100.000	1.375.000	1.650.000	1.925.000	2.200.000	2.750.000	3.300.000
Nominal Heat Output	kW	698	814	930	1046	1163	1453	1744	2034	2325	2907	3488
	kcal/h	600.000	700.000	800.000	900.000	1.000.000	1.250.000	1.500.000	1.750.000	2.000.000	2.500.000	3.000.000
Standby Loss	%	0,17	0,16	0,16	0,16	0,16	0,15	0,15	0,15	0,15	0,15	0,15
Gas Volume	m³	0,857	1,341	1,376	1,410	1,465	1,926	2,221	2,647	2,912	3,575	4,839
Combustion Chamber Inner Dia.	mm	700	860	860	860	860	880	880	1000	1000	1050	1180
Combustion Chamber Length	mm	1453	1730	1730	1730	1730	2145	2490	2400	2650	2640	3000
Combustion Chamber Volume	m³	0,559	1,005	1,005	1,005	1,005	1,305	1,514	1,885	2,081	2,286	3,281
Boiler Height	mm	1511	1400	1400	1400	1400	1810	1810	1918	1918	2171	2325
Boiler Width	mm	1240	1450	1450	1450	1450	1550	1550	1650	1650	1890	2050
Boiler Length	mm	2005	2400	2400	2400	2400	2800	3100	3000	3268	3300	3670
Exit Flue Gas Connection Dia.	mm	400	450	450	450	450	500	500	500	500	600	600
Exit Flue Gas Connection Height	mm	956	1045	1045	1045	1045	1123	1123	1277	1277	1406	1480
Inlet Flange	-	NW 100	NW 125	NW 125	NW 125	NW 125	NW 150	NW 150	NW 150	NW 150	NW 200	NW 200
Exit Flange	-	NW 100	NW 125	NW 125	NW 125	NW 125	NW 150	NW 150	NW 150	NW 150	NW 200	NW 200
Filling and Drain Pipes	inch	¾"	1"	1"	1"	1"	1"	1"	1"	1"	1"	1"
Expansion Tank Outlet	inch	2"	2½"	2½"	2½"	2½"	2½"	3"	3"	4"	4"	4"
Expansion Tank Inlet	inch	1½"	2"	2"	2"	2"	2½"	2½"	2½"	2½"	2½"	3"
Weight	kg	1397	1888	1945	2002	2093	2791	3125	3558	3854	4991	6074
Water Content	lt	569	1019	979	938	874	1371	1583	1653	1818	2560	3370

BOILER CONTROL PANELS



Boiler Control Panel Device Functions :

1. Main switch : Energize or shut off the panel

2. Safety limit thermostat: If boiler water temperature is out of control (boiler thermostat are not functioning, electric wire fault, etc) and reaches 100 °C (+/- 5 °C) it will stop the burner immediately. It is manual reset type high temperature safety device. It will not reset automatically before reset it find the reason for high temperature.

3. Boiler thermostat : It regulates the desired boiler water temperature. Set it to system need temperature.

4. 2nd Stage thermostat : It regulates the burner stages. Set it 6 to 10 C below the boiler thermostat value. When the boiler water temperature reached to set value it turns down the burner to 1st stage.

5. Temperature indicator and pressure gauge: They indicate the boiler water temperature and pressure.

6. Weather compensated control device : It is a multifunctional device but the main aim is regulating the desired boiler water temperature automatically according to atmospheric conditions with the help of motorized 3 way valve. (setting must be performed by a qualified service at commissioning)

BOILER CONTROL PANEL WIRING DIAGRAMS

